Claims

The claims are amended as follows:

1. (Currently Amended) An apparatus for collision resolution in a home networking system using carrier sense signals, the apparatus comprising:

a received frame state extraction unit, which extracts a current state CurST of a frame including carrier sense signals received by a station that is connected to a network, a data transmission priority RxPRI of the received frame, and a reference time signal do_FBOS for determining a final state of the carrier sense signals of the received frame, wherein the reference time signal do_FBOS is assigned to be within a last section ~~of~~ in a back-off slot section ~~in~~ of the received frame to determine the final state of the carrier sense signals, the back-off slot section to be followed by a priority slot section of the received frame for transmitting data;

a maximum back-off level (MBL) calculation unit, which calculates MBL values MBL_reg based on the current state CurST, the priority RxPRI, and the reference time signal do_FBOS;

MBL registers, which store the MBL values MBL_reg;

a back-off level (BL) calculation unit, which calculates BL values BL_reg based on the current state CurST, the priority RxPRI, the reference time signal do_FBOS, and the MBL values MBL_reg; and

BL registers, which store the BL values BL_reg.

2. (Canceled)

3. (Original) The apparatus of claim 1, wherein when the received frame is determined as a normal frame, if the MBL value MBL_reg of a previous frame is 0, the MBL_reg becomes 0, and if the MBL value MBL reg of the previous frame is not 0, the MBL value MBL_reg is obtained by subtracting 1 from the MBL value MBL_reg of the previous frame, after it is determined that the priority RxPRI and the MBL value MBL_reg of the previous frame are the same, and when the received frame is determined as a collision frame, if the MBL value MBL_reg of the previous frame is 0, the MBL value MBL_reg is obtained by adding the MBL value MBL_reg of the previous frame to the number of back-off signals of the received frame, and if the MBL value MBL_reg of the previous frame is not 0, the MBL value MBL_reg is obtained by subtracting 1

from the value which is obtained by adding the MBL value MBL_reg of the previous frame to the number of back-off signals.

4. (Original) The apparatus of claim 1, wherein when the received frame is determined as a normal frame, if the BL value BL_reg of a previous frame is 0, the BL value BL_reg is set to 0, and if the BL value BL_reg of the previous frame is not 0, the BL value BL_reg is obtained by subtracting 1 from the BL value BL_reg of the previous frame, after it is determined that a corresponding station is in a data transmission standby state and a priority RxPRI of the received frame is the same as a BL value BL_reg of the previous frame;

when the received frame is determined as a collision frame, if a pseudo random number generator (PRNG) value generated in a PRNG circuit of a media access control (MAC) in the station is 0, the BL value BL_reg of the previous frame becomes the BL value BL_reg;

when the received frame is determined as a collision frame, if the PRNG value is not 0 and the BL value BL_reg of the previous frame is 0, the BL value BL_reg is obtained by adding the BL value BL_reg of the previous frame to the number of back-off signals that are observed prior to a corresponding back-off slot; and

when the received frame is determined as a collision frame, if the PRNG value is not 0 and the BL value BL_reg of the previous frame is not 0, the BL value BL_reg is obtained by subtracting 1 from the value which is obtained by adding the BL value BL_reg of the previous frame to the number of back-off signals observed prior to the PRNG value.

5. (Original) The apparatus of claim 1, wherein each of the MBL registers and the BL registers are assigned to each of the priority slots of the received frame, and each of the priority slots is designed to accommodate more than 5 bits to provide collision resolution to a maximum of 25 stations.

6. (Currently Amended) A method for collision resolution in a home networking system using carrier sense signals, the method comprising:

extracting a current state CurST of a frame including carrier sense signals received by a station that is connected to a network, a data transmission priority RxPRI of the received frame, and a reference time signal do_FBOS for determining a final state of the carrier sense signals of the

received frame, wherein the reference time signal do_FBOS is assigned to be within a last section ~~of~~ in a back-off slot section ~~in of~~ the received frame to determine the final state of the carrier sense signals, the back-off slot section to be followed by a priority slot section of the received frame for transmitting data;

calculating MBL values MBL_reg based on the current state CurST, the priority RxPRI, and the reference time signal do_FBOS;

storing the MBL values MBL_reg;

calculating BL values BL reg based on the current state CurST, the priority RxPRI, the reference time signal do_FBOS, and the MBL values MBL_reg; and

storing the BL values BL_reg.

7. (Previously Presented) The method defined by claim 6 wherein said calculating MBL values comprises:

determining the priority RxPRI and the MBL value MBL_reg of the previous frame are the same;

determining the received frame as a normal frame;

determining the MBL value MBL_reg of a previous frame;

assigning the MBL_reg a value of 0 in response to the MBL value MBL_reg of the previous frame having the value of 0;

assigning the MBL_reg a value of 1 subtracted from the MBL value MBL_reg of the previous frame in response to the MBL value MBL_reg of the previous frame not having the value of 0;

determining the received frame as a collision frame;

obtaining the MBL value MBL_reg by adding the MBL value MBL_reg of the previous frame to the number of back-off signals of the received frame in response to the MBL value MBL_reg of the previous frame having the value of 0; and

obtaining the MBL value MBL_reg by subtracting 1 from the value which is obtained by adding the MBL value MBL_reg of the previous frame to the number of back-off signals in response to the MBL value MBL_reg of the previous frame not having the value of 0.

8. (Previously Presented) The method defined by claim 6 wherein said calculating BL values comprises:

determining a corresponding station is in a data transmission standby state and a priority RxPRI of the received frame is the same as a BL value BL_reg of the previous frame;

determining the received frame as a normal frame;

determining the BL value BL_reg of a previous frame;

assigning the BL value BL_reg a value of 0 in response to the BL value BL_reg of a previous frame having the value of 0;

assigning the BL value BL_reg a value of 1 subtracted from the BL value BL_reg of the previous frame in response to the BL value BL_reg of the previous frame not having the value of 0;

determining the received frame as a collision frame;

obtaining the BL value BL_reg by assigning the BL value BL_reg of the previous frame in response to a pseudo random number generator (PRNG) value generated in a PRNG circuit of a media access control (MAC) in the station having the value of 0;

obtaining the BL value BL_reg by adding the BL value BL_reg of the previous frame to the number of back-off signals that are observed prior to a corresponding back-off slot in response to the PRNG not having the value of 0 and the BL value BL_reg of the previous frame having the value of 0; and

obtaining the BL value BL_reg by subtracting 1 from the value which is obtained by adding the BL value BL_reg of the previous frame to the number of back-off signals observed prior to the PRNG value in response to the PRNG not having the value of 0 and the BL value BL_reg of the previous frame not having the value of 0.